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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,730	12/29/2000	Koichi Watanabe	017447/0170	3938
22428 7590 06/12/2008 FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007				
EXAMINER				
IP, SIKYIN				
ART UNIT		PAPER NUMBER		
1793				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

09/720,730

Applicant(s)

WATANABE ET AL.

Examiner

Sikyin Ip

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1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3, 7-10, 15-17 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 7-10, 15-17 and 20-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-884)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

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DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 28 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitation "working rate of 55% or more" does not support by Table 5 of instant specification as relied on by applicants. A point from the Table cannot support an open range which includes working rate greater than 95%.

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating

obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 7-10, 15-17, 20-23, and 26-28 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5693203 to Ohhashi et al (col. 6, lines 32-63) in view of applicant's admission (Rule 132 declaration filed on April 12, 2004, items 3-4).

Ohhashi discloses the features including the claimed backing plate (col. 4, lines 65-67), Nb sputtering target (col. 4, lines 61-64) and grain size (col. 6, lines 1-20). Ohhashi discloses uniformity of recrystallized structure of sputtering target would be destructured by (1) Explosive bonding, Hot rolling and (3) Grooved process (col. 3, lines 35-51 and col. 4, lines 9-26). These examples show that recrystallized structure of sputtering target is expected in sputtering target taught by Ohhashi. The recrystallization temperature varies with material which is contemplated within ambit of ordinary skill artisan to use the conventional recrystallization temperature for known material in order to obtain a recrystallized structure. Ohhashi also discloses a sputtering target structure (Figure 1). The difference between the reference and the claims are as follows: the cited reference does not disclose the % of grain deviation and O and/or Ta content dispersion in the target. However, sputtering target taught by Ohhashi is directed to uniform microstructure which requires uniform grain size and no or little diffusion of their constituent atoms (col. 6, lines 32-62). Thus, uniform grain size meets the claimed grain size range. Ohhashi does not disclose O and Ta contents. But, claimed Ta concentration is merely conventional in crude niobium metal. Moreover, applicant's admission in Rule 132 declaration, items 3-4, acknowledges that Ta and O are inevitable impurities that exist even in high purity Nb sputtering target. In view of applicant's admission, ordinary skill artisan would recognize Nb sputtering target of Ohhashi would inherently possess Ta and O as inevitable impurities. Since Ta and

O are inevitable impurities, their dispersion would be uniform in Nb sputtering target. Thus, the dispersion % of said O and Ta is zero. Moreover, difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz, 38 USPQ 143 and In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA 1966).

With respect to the limitation

~~being respectively defined by the following equation, for respective measured content values~~
" ~~of 9 specimens sampled at respective predetermined positions~~ in the target: " in claim 1, for example, first it is a product-by-processing step which carries insignificant patentable weight if it does not change the structure/property of the final product. Second, said step merely measure the dispersions of Ta and O impurities which are already in the target if they do exist. Third, in said step, the number of samplings at various positions in the target would not affect the dispersion % when the dispersion of Ta and O impurities are uniform in the target.

With respect to the dispersion % expression, that it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Taklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75.

Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5693203 to Ohhashi et al as applied to claims above, and further in view of acknowledged prior art admission in page 2, lines 1-24.

The claimed subject matter as is disclosed and rejected above by the cited reference(s) except for the use of the Nb sputtering target. However, acknowledged prior art discloses the claimed use of the Nb sputtering target in the same field of endeavor or the analogous metallurgical art. Therefore, it would have been obvious to one having ordinary skill in the art of the cited references at the time the invention was made to use Nb sputtering target as taught by acknowledged prior art admission in order to reduce the interconnection resistance and improve reflow characteristics of Al (See instant specification page 2, lines 20-24). In re Venner, 120 USPQ 193 (CCPA 1958), In re LaVerne, et al., 108 USPQ 335, and In re Aller, et al., 105 USPQ 233.

Response to Arguments

Applicant's argument filed February 15, 2008 have been fully considered but they are not persuasive.

Applicants argue that “ *Ohhashi does not disclose a method for achieving the structure as claimed* “. But, instant rejected claims are product claims. Moreover, applicants fail to show by factual evidence that the instant method is critical and required to produce unexpected properties.

Applicants argue that Ohhashi does not disclose claimed amount and dispersion in paragraph bridging pages 7-8 of instant remark. First, the claimed Ta and O are inevitable impurities. There is no factual evidence that the claimed ranges of Ta and O impurities are critical and not inherent in commercial Nb. The claimed dispersion %

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includes zero when dispersion is uniform/constant that maximum value is same as minimum value.

~~value.~~ Applicants would like to clarify that while a uniform ~~distribution~~ of impurities would suggest a zero dispersion %, as dispersion % is defined in the claims, a uniform dispersion % necessarily means that the dispersion % is ~~significant~~, not zero. That fact that a value of a parameter

Applicants argue that “is constant does not suggest that the parameter is zero” But, it

is found inconsistent with the expression recited in instant claim 1 below

$$\text{dispersion (\%)} = \{(\text{maximum value} - \text{minimum value}) / (\text{maximum value} + \text{minimum value})\} \times 100,$$

that “constant” means

maximum value same as minimum value. According to recited expression, when maximum value is same as minimum value, the dispersion is zero.

Applicants’ argument in page 8, first paragraph is noted. But, uniform microstructure as taught by Ohhashi does not exclude uniform dispersion. Moreover, the dispersion % does not affected by the claimed Ta and/or O concentration.

Applicants argue that Ohhashi does not teach Nb sputtering target contain impurities Ta and O and their dispersion. But, applicants’ attention is directed to col. 6,

(3) a sputtering target assembly composed of two-layer structure of a sputtering target and a backing plate having an bonded interface therebetween wherein the sputtering target is made of a material selected from the group consisting of a refractory metal of W, Mo, Ti, Ta, Zr and Nb and refractory metal-based alloys and said backing

lines 32-37 of Ohhashi (). Nb is taught as sputtering target. With respect to the Ta and O impurities contents and their dispersions that first if the Ta and O are inevitable impurities, they are inherently in the Nb sputtering target. Difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz, 38 USPQ 143. Changing form, purity, or other characteristic of an old product does not render the novel form patentable where the difference in form, purity or characteristic was inherent in or rendered obvious by the prior art. In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA

1966). Moreover, the claimed Ta concentration is merely conventional concentration in crude niobium metal. Second, if the dispersion is uniform (maximum value equal minimum value), then the dispersion is zero. Ohhashi discloses target having uniform microstructure (col. 6, line 42) and with no or little diffusion of their constituent atoms (col. 6, lines 57-58). That reads dispersion is zero. Furthermore, the instant claimed dispersion (%) of oxygen is up to 80% (claim 18) which hardly excludes any dispersion. Assuming arguendo that the Ta dispersion is non-uniform as targets 3 and 4 in instant Table A. The difference of resistivity of interconnection film is less than 3%. In view of data in instant specification that the claimed dispersions do not have significant affect on sputtering target properties. Thus, the claimed dispersion (%) has no criticality or unexpected result.

As noted throughout the prosecution of this application, the combination of Ta amount and dispersion, or oxygen amount and dispersion as recited in claim 1 is not inherent.

Applicants argue that " in Ohhashi. Moreover, the Patent Office has not met its burden of showing that the amount "

But, in 132 declaration, section 4, filed on April 12, 2004, applicants argue that

(4) JP 62-103335 provides further evidence that one skilled in the art would not reasonably interpret claims 1 and 18 to contain a zero amount of Ta and oxygen, respectively. I understand that JP 62-103335 was submitted in the Information Disclosure Statement filed on December 29, 2000 in the above identified application. JP 62-103335 discloses super high purity Nb having an excellent workability for a superconductive material and discloses the Nb as containing 30 ppm or less of Ta and 10 ppm or less of each of oxygen, carbon, nitrogen and hydrogen, which is produced by a high quality manufacturing method. As demonstrated by JP 62-103335, Ta and oxygen exist as impurities in Nb even for super high purity Nb produced by high quality manufacturing methods. One skilled in the art would reasonably interpret claims 1 and 18 as requiring some amount of Ta and oxygen impurity as evidenced by JP 62-103335, because these " impurities exist even in super high purity Nb.

" So, Ta and O impurities in ultra high purity Nb is well known and are controlled to less than 30 ppm and 10 ppm respectively. Since the Ta and O impurities are well known in the art of Ohhashi, Ohhashi needs not to disclose the well known impurities. Moreover, as is shown by JP

62-103335 that Ta and O are controlled to be less than 30 ppm and 10 ppm respectively in ultra high purity Nb which are much lower than the instant claimed Ta less than 3000 ppm and O less than 200 ppm (claims 1 and 18). In view of JP 62-103335, Ta and O are known to be much higher in crude niobium metal.

Ohhashi does not suggest the unexpected advantages resulting from the claimed amounts and dispersion

Applicants argue that “*amounts and dispersion*”.

But, the fact that applicants have recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Because applicants have different reason to reduce the Ta and O impurities that does not change the teaching of prior art to eliminate the Ta and O impurities. Moreover, applicants have not shown any unexpected advantages or unexpected result that would not be inherently possessed by the target of cited reference.

Applicants' argument in paragraph bridging pages 11-12 of instant remarks is noted. But, instant dispersion does not exclude uniform dispersion.

Applicants' argument in page 12, first full paragraph, of instant remarks is noted. But, as is evinced by JP62-103335 above that Ta and O are known impurities in Nb sputtering target. Therefore, reducing them is contemplated within ambit of ordinary skill artisan. Moreover, there is no factual evidence that the recited dispersion % is critical even when the concentration of Ta and O are low less than 30ppm and 10ppm respectively.

Independent claim 1 also recites features regarding average grain diameter, and diameter range. Nowhere does Ohhashi disclose the average grain diameter, or diameter range, as recited in claim 1. Ohhashi merely discloses a crystal grain size of no more

Applicants argue that " than 350 μm

But, no more than 350 μm overlaps the claimed grain size. Moreover, there is no factual evidence that the claimed grain size is critical and possesses unexpected result.

Applicants' argument in paragraph bridging pages 12-13 of instant remarks is noted. But, Ohhashi discloses uniformity of recrystallized structure of sputtering target would be destructured by (1) Explosive bonding, Hot rolling and (3) Grooved process (col. 3, lines 35-51 and col. 4, lines 9-26). These examples show that recrystallized structure of sputtering target is expected in sputtering target taught by Ohhashi.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Applicant is reminded that when amendment and/or revision is required, applicant should therefore provide a concise explanation and support with page and line number in the specification for any amendments made to the disclosure. See 37 C.F.R. Part §41.37 (c)(1)(v).

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Ip whose telephone number is (571) 272-1241. The examiner can normally be reached on Monday to Thursday from 5:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King, can be reached on (571)-272-1244.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sikyin Ip/
Primary Examiner, Art Unit 1793

June 9, 2008